REMARKS

Reexamination and reconsideration of the present application are requested.

Applicants have amended claims 1, 4, 9 and 15, and added new claims 18-19. Accordingly, claims 1-19 remain pending in the application.

35 U.S.C. § 103

The Office Action rejected claims 1-17 under 35 U.S.C. § 103 over Stambaugh et al. U.S. Patent No. 4,970,454 ("Stambaugh") in view of Roberts et al. U.S. Patent No. 5,743,661 ("Roberts").

Applicants respectfully traverse those rejections for at least the following reasons.

Claim 1

Among other things, the apparatus of claim 1 features an electrical characteristic measurer that is connected to the electrical element and is driven in response to a control signal to output to a pad a value that is indicative of the electrical characteristics of the electrical element, wherein the pad is not connected to any output driver of the semiconductor device.

For example, as disclosed in the specification with respect to the embodiment of FIG. 5 of the present Specification, beneficially, the pad to which the electrical characteristic measurer is connected and to which it outputs the value that is indicative of the electrical characteristics of the electrical element, is an RQ PAD that is adapted to receive external addresses or commands (see page 9, paragraph 0031).

Such a pad only includes an input receiver, and does not have an output driver since it is adapted to receive input signals, but not to transmit output signals.

In contrast, the pad 28 shown, for example, in FIG. 3 of Stambaugh is connected to a functional circuit 54 that includes an output driver 60. That is, the pad 28 of Stambaugh is connected to an input/**output pin** 36 (see col. 5, line 26; col. 3, lines 46-47) and therefore to an output driver.

Also among other things, the apparatus of claim 1 features an electrical characteristic measurer that is connected to the electrical element and a pad of the semiconductor device, and that is driven in response to a control signal to output a value that is indicative of the electrical characteristics of the electrical element to the pad.

The Office Action generally cites FIGs. 3 and 6-9 of Stambaugh as allegedly showing the recited electrical characteristic measurer, but does not cite any element in the figures that allegedly corresponds to the recited electrical characteristic measurer. Meanwhile, at one place, the Office Action cites an unknown "NCOMS transistor" (?) as allegedly corresponding to the electrical element whose characteristics are measured by the apparatus. In another place, the Office Action states that the electrical element is "P-channel transistor 42, N-channel transistor 44, 46."

Which is it?

Respectfully, Applicant's submit that the Office Action does not fairly apprise Applicants as to what elements of the cited references the Examiner believes correspond to the recited elements of claim 1.

In any event, the Examiner has cited various elements of FIG. 3 of Stambauagh and apparently believes that FIG. 3 shows the elements of claim 1.

Applicants respectfully disagree.

Stambaugh clearly teaches that the "electrical element" whose characteristics are being measured in the circuit of FIG. 3 is the NMOS transistor 24. Stambaugh also clearly teaches that the NMOS transistor 24 outputs to the pad 28 a value indicative of its own electrical characteristics.

Therefore, the circuit of FIG. 3 of Stambaugh cannot have any "electrical characteristic measurer that is **connected to the electrical element and a pad** of the semiconductor device, and that is driven in response to a control signal **to output a value** that is indicative of the electrical characteristics of the electrical element to the pad." For example, the N-channel transistor clearly is not **connected to the pad** 28, nor does it output any value to the pad 28. So it cannot correspond to the electrical characteristic measurer. Meanwhile, the P-channel transistor 42 and N-channel transistor 44 of the isolation circuit 52 serve to isolate the NMOS transistor 24 from the pad 28 during a normal operating mode, when the test mode is not enabled. The P-channel transistor 42 and N-channel transistor 44 do not output any value to the pad 28. So, the P-channel transistor 42 and N-channel transistor 44 cannot correspond to the electrical characteristic measurer, either.

Roberts was cited as showing a test switch circuit control, and it was not alleged in the Office Action that Roberts discloses any electrical characteristic measurer that is connected to the electrical element and a pad of the semiconductor

device, and that is driven in response to a control signal to output a value that is indicative of the electrical characteristics of the electrical element to the pad.

Accordingly, for at least the foregoing reasons, Applicants respectfully request that the Examiner withdraw the rejection of claim 1 over Stambaugh and Roberts, and allow claim 1.

Claims 2-8

Claims 2-8 depend from claim 1 and are deemed to be allowable for at least that reason, and for the following reasons.

Claim 4

Among other things, in the apparatus of claim 4 the electrical characteristic measurer includes an NMOS transistor that is **the same as a size as** an NMOS transistor connected to a pad that is connected to a data input/output pin.

Applicants respectfully submit that no such feature is disclosed by Stambaugh, or by any combination of the cited art.

The Office Action cited FIG. 7 of Stambaugh as allegedly showing an electrical characteristic measurer includes an NMOS transistor of **the same as a size as** an NMOS transistor connected to a pad that is connected to a data input/output pin, citing elements 96 and 98.

Applicants respectfully disagree that Stambaugh discloses an electrical characteristic measurer includes an NMOS transistor of the same size as an NMOS transistor connected to a pad that is connected to a data input/output pin.

At the outset, FIG. 7 does not indicate or even suggest anything regarding the

relative sizes of the transistors 96 and 98. Furthermore, Applicants do not see anything in the description of FIG. 7 at col. 9, lines 8-54, that indicates or even suggests anything regarding the relative sizes of the transistors 96 and 98.

Accordingly, Applicants respectfully request the Examiner to provide a citation that indicates that the transistors 96 and 98 are the same size, or withdraw the rejection.

Meanwhile, Applicants submit that such a feature has specifically disclosed advantages, and is not any mere "design choice." For example, as disclosed in the specification with respect to the embodiment of FIG. 5, beneficially the pad to which the electrical characteristic measurer is connected and to which it outputs the value that is indicative of the electrical characteristics of the electrical element, is an RQ PAD that is adapted to receive external addresses or commands (see page 9, paragraph 0031). Such a pad only includes an input receiver, and does not have an output driver since it is adapted to receive input signals, but not to transmit output signals. So, the input capacitance of such a pad is less than that the input capacitance of a pad connected to an input/output pin of an output driver. However, by making an NMOS transistor of the electrical characteristic measurer **the same as a size as** an NMOS transistor connected to a pad that is connected to a data input/output pin, the apparatus of claim 4 can match the input capacitance of the pad connected to the electrical characteristic measurer to the input capacitance of a pad connected to a data input/output pin.

Finally, Applicants note that the Office Action mentions that the NMOS

transistors have "structural connections between them." Applicants respectfully fail to understand the significance of this statement as no such feature is recited or implied by claim 4.

Accordingly, for at least these reasons, Applicants respectfully submit that claim 4 is clearly patentable over any possible combination of Stambaugh and Roberts.

Claim 9

Among other things, the apparatus of claim 9 features an electrical characteristic measurer, to which the electrical element is connected, that is driven responsive to the control signal **to output to a first pad** of the semiconductor device a value indicative of the electrical characteristics of the electrical element, **wherein the first pad is not connected to any output driver of the semiconductor device**.

Accordingly, for similar reasons to those set forth above with respect to claim 1, Applicants respectfully request that the Examiner withdraw the rejection of claim 1 over Stambaugh and Roberts, and allow claim 9.

Claims 10-14

Claims 10-14 depend from claim 9 and are deemed to be allowable for at least that reason

Claim 15

Among other things, the method of claim 15 includes driving the electrical characteristic measurer responsive to the control signal, to output a value indicative of the electrical characteristics of the electrical element to a first pad of the

semiconductor device that is not connected to any output driver of the semiconductor device.

Accordingly, for similar reasons to those set forth above with respect to claim 1, Applicants respectfully request that the Examiner withdraw the rejection of claim 1 over Stambaugh and Roberts, and allow claim 15.

Claims 16-17

Claims 16-17 depend from claim 15 and are deemed to be allowable for at least that reason.

NEW CLAIMS 18 AND 19

Among other things, the apparatus of claim 18 and the method of claim 19 each feature an electrical characteristic measurer having an NMOS transistor, a size of the NMOS transistor being the same as a size of an NMOS transistor connected to a second pad that is connected to a data input/output pin, wherein an output driver of the semiconductor device is connected to the second pad.

As explained above with respect to similar features in claim 4, the cited art does not disclose the two NMOS transistors having the same size.

Meanwhile, Applicants also note that claim 18 recites that the two NMOS transistors are connected to two different pads: (1) a first pad connected to an electrical characteristic measurer (the first pad is **not** connected to any output driver of the semiconductor device); and (2) a second pad of a data input/output pin (the second pad **is** connected to any output driver of the semiconductor device).

Accordingly, for at least these reasons, Applicants respectfully submit that claims 18-19 clearly define over the cited prior art.

CONCLUSION

In view of the foregoing explanations, Applicants respectfully request that the Examiner reconsider and reexamine the present application, allow claims 1-19, and pass the application to issue. In the event that there are any outstanding matters remaining in the present application, the Examiner is invited to contact Kenneth D. Springer (Reg. No. 39,843) at (703) 715-0870 to discuss these matters.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 50-0238 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17, particularly extension of time fees.

Respectfully submitted,

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